Subject: Altec 902 / Edgarhorns: compensation experiments
Posted by Floyd Andrews on Thu, 24 Mar 2005 23:13:33 GMT
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I've just gotten a pair of Edgarhorn 650 hz round horns to use with Altec 902 drivers. These have replaced a pair of JBL 2345 horns with Selenium 205 1" drivers. The new setup sounds fabulous; I couldn't be more pleased. After waiting about a week to get used to the new gear, I started playing with compensation components. My system has an active crossover, so the 902's are driven directly from a small tube amp. I wasn't sure that I even needed more high end, but I wanted to try it out. 50 ohms in parallel with .47 mfd was way too hot. So was 25 ohms and .47 mfd. Right now I'm using 8 ohms and .47, but I think that this still may be too much. Does anyone out there have any experience with this driver/horn combination? What is the effect if I go to a smaller capacitor, say .33 or .22? All suggestions appreciated. thanks.

Subject: Re: Altec 902 / Edgarhorns: compensation experiments
Posted by Wayne Parham on Fri, 25 Mar 2005 03:17:49 GMT
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My experience with the round 650Hz tractrix horns Edgar sells is that they need 8dB compensation above 8kHz with an Eminence PSD2002 and 12dB compensation above 4kHz with a JBL 2426.JBL 2426 on Edgar round 650Hz tractrix hornStart EQ around 4kHz at 6dB/octave so that there's some boost at 8kHz and full augmentation at 16kHz. The collapsing DI of the tractrix horn provides some EQ, but not enough to make response flat above 8kHz with either the JBL 2426 or the Eminence PSD2002.

Subject: Thanks, Wayne!
Posted by Floyd Andrews on Fri, 25 Mar 2005 15:53:11 GMT
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Thanks for your response. Will continue the experiments this weekend.

Subject: Series and Shunt Resistance
Posted by Wayne Parham on Fri, 25 Mar 2005 18:38:44 GMT
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Just a suggestion - You might want to use a resistor in shunt along with a resistor in series. Bypass the series resistor with capacitance for high frequency augmentation. If you just have a

series resistance, it will raise the amount of midrange as well as the top octave or two. The highest frequencies are augmented by the rising impedance caused by voice coil inductance. The midrange peak is caused by various resonances, such as diaphragm mechanical resonance, horn flare 1/4 wave resonances and interaction of crossover capacitors and voice coil inductance. If you're familiar with Spice, you can use it to calculate a network that will work for you. There are some illustrations of this in the documents at the links below.Crossover Electronics 101Schematics and Response Charts

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Subject: Re: Series and Shunt Resistance
Posted by spkrman57 on Sun, 27 Mar 2005 17:07:35 GMT
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I would use the 14 ohm shunt with a 30 ohm series(paralleled with .33 ufd) like the 4 pi crossover.By the way, I am getting ready to try a comparison between the JBL 2426 and the Altec 902 on the 650hz round tractix(Edgar) and the 650hz wooden tractix(Martinelli). Two different drivers and 2 different horns to mix and match and see which I like best.By the way, I still prefer passive crossover on my JBL/Altec systems. Makes life easier. Ron

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Subject: Uniform DI verses Collapsing DI
Posted by Wayne Parham on Sun, 27 Mar 2005 21:34:02 GMT
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I would suggest that you compare a system with uniform or matched directionality to another with axisymmetric horns having collapsing DI. More specifically, you would be comparing a loudspeaker system that uses tractrix round horns with another that uses 90x40 horns. That involves using matched mids and bass systems and, in the case of the uniform DI speaker, you'll also want a crossover that minimizes comb filtering between adjacent subsystems. In my opinion, the type of system you are making determines the horn you should use.It's not just a matter of comparing one particular horn with another, that's kind of like comparing a car's tires without discussing suspension. Unless they are of the same general type, a comparison isn't really appropriate. Some things can be quantified but overall performance cannot. Some tires are more suited for one kind of vehicle or another, like tall, bouncy slicks for a drag car or short, rigid tires for a road race. Both are designed to maximize traction, but one is optimized for straight-line launch and the other for lateral hold. Either way, the tuner has to optimize properly or the car isn't setup right. Put a drag slick on an indy car and you can out-corner it in a mini-cooper. Put a Formula I tire on a top fueler and you'll melt it to the rim without even leaving the lights.So the long story short is that I don't think it is going to really work comparing an individual round horn to a 90x40. The system optimizations are different. One is optimized when power response is uniform, the other when on-axis response is uniform. A nice experiment might be to compare a loudspeaker system with all round horns to another with all 90x40 radial horns. If you like the tractrix curve, you could use round tractrix horns for one system and for the other, use radial

horns having a tractrix expansion in the vertical plane and uniform 90° in the horizontal plane. But whatever the flare profile, I suggest the 90x40 horn be used in a system that has a DI matched midwoofer or a cornerhorn that uses all 90° flares. I'd use the round horn in a system that has all axisymmetric horns. Then you can compare systems, because I think that makes a lot more sense.

Subject: Re: Series and Shunt Resistance
Posted by Floyd Andrews on Tue, 29 Mar 2005 01:19:53 GMT
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thanks, spkrman! I will try those values next. I'm very interested in hearing the results of your comparison of the two horns. Martinelli was on my short list of horns before I got the Edgars.

Subject: Re: Series and Shunt Resistance
Posted by Floyd Andrews on Tue, 29 Mar 2005 01:25:46 GMT
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Thanks, Wayne! Right after I got your message I went home and put a 25 ohm resistor in shunt before the series resistor. That value was used just because I had it on hand. You were right (as usual) Sounded much better. Now to get a few more resistors to try for an optimum combination. I'm going to try some of the values that you use in the Pi crossovers next.

Subject: Re: Series and Shunt Resistance
Posted by Wayne Parham on Tue, 29 Mar 2005 02:41:21 GMT
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Glad that helped, Floyd. Do plug the numbers into Spice or measure the system, whichever is best for you. That will make sure you've chosen values that give you good clean response. Depending on the reactive values surrounding the circuit, you may want the shunt resistance after the series resistance instead of before it. It will also help you select the values that work best.

Subject: Wish i understood everthing you said...
Posted by spkrman57 on Tue, 29 Mar 2005 18:32:11 GMT
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Wayne, The "DI" factor loses me. I know I just tried out my 1st JBL compression driver(2426J). I used the 4 Pi-pro figures(15 ohm shunt and 33 ohm series/.33 ufd cap). I also used .68 ufd bypass caps on the PE 1.6 khz hi-pass crossover. So far I think the caps are still new and not smoothed out(less than 2 hrs time on them). I find the JBL to be rather bright in the upper midrange/lower treble area used on the Martinelli horn. I know that the 2426J is a 16 ohm driver, but I have used Altec 8 ohm and 16 ohm drivers without changing up the crossover with little difference of sound. I think the JBL with titanium diaphram is more brittle sounding than the aluminum of the Altec drivers I have used. I set up the crossover this time with easy "connect/disconnect" terminals to swap out the horns quickly.I have my Altec 902B on my 650hz Edgar horn and will be trying it out tonight. I think the JBL needs less HF compensation than the Altec 1" drivers. Ron

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Subject: Re: Directivity Index, Collapsing DI, etc.
Posted by Wayne Parham on Tue, 29 Mar 2005 20:45:32 GMT
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DI is directivity index. Round tractrix horns become more directional as frequency goes up. This is called collapsing DI. They sound good on axis, best if the room is very absorbent.Horns like this have wide dispersion at the lower crossover point and which becomes more narrow as you reach the upper crosover point. If you have a midrange and a tweeter with round horns like this, then the pattern widens and narrows twice, at the woofer/mid crossover and again at the mid/tweeter crossover.What this does is to make the sound in the room uneven. Sound off-axis is unbalanced, being a lot louder near the crossover points. Even when sitting on-axis in the "sweet spot," sound reflected back to you is unbalanced. You can get away with that if the room is treated to make it very absorbent, but if not, the sound is unnatural. I think it's unnatural sounding anyway, since anytime you step outside of the narrow "sweet spot," the good sound turns bad.Another thing about round horns is that energy distribution up and down is the same angle as side to side, so it is wasted on the floor and the ceiling where it is not needed or wanted. That's why they were abandoned in the 1930's for radial and sectional horns, intended to place the sound where it was wanted. Don't get me wrong. Most speakers have directional characteristics like this. Direct radiators are the same way. They begin to become directional at the frequency where wavelength roughly equals diameter. Direct radiator loudspeakers and round horn systems can be made to sound very good. At least on-axis and in a very narrow range, you can expect them to sound very nice in the right setting. If you have wall to wall furnature, some furnature and curtains, you'll probably be alright.But one of the biggest advantages of horns is their ability to direct the sound where you want it to go. So for best results, I prefer to use horns that have directional characteristics that cover the room uniformly instead of those that have collapsing DI. This is particulary true in the horizontal plane. If a person is going to use a horn, I'd want to see it used to its best advantage.

Subject: I understand a little bit better now!

Posted by spkrman57 on Wed, 30 Mar 2005 18:01:41 GMT
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Wayne, I wonder why I like the round horns vs the 40 X 90 horns. I think it is because I listen off-axis to the round horns in a small room and they sound quite nice and present a very nice "3-D" imaging. With the 40 X 90 horns in a small room, I find a tad bit too much of upper midrange that seems to take over the music.So I guess what I am trying to say is that with directional type horns you can set them up to better present the soundstage you like best. With the 40 X 90 horns, they spread across the soundstage to where you on off-axis less often.Ron

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Subject: Re: I understand a little bit better now!
Posted by Wayne Parham on Wed, 30 Mar 2005 23:58:56 GMT
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Don't get me wrong, I like the sound of the salad bowl tweeters. I like the sound of the large round

about the same at low levels. But turn the volume up, and my speakers stay clear where the others get conjested. Those round horns make too much unbalanced sound bouncing around the room. Speakers that make the sound uniform throughout the room as opposed to just straight ahead sound much better to me, especially when playing complex material.But you may just like your salad bowls better. That's cool. They are very nice, and they sound good too. You might like how they look, they may just "feel" better to you. Maybe your compression driver and crossover combinations work better for you with salad bowls. I don't know. But I know that if you want to hear what I'm talking about, you can't really just compare just the tweeter horns. You have to compare the whole system.Come on down to the Great Plains Audiofest, and try to spend

isn't so much activity and visiting with other people. Or maybe just build a pair for yourself, stick to the plans and see what you think. Live with them for a while. Listen to them in the "sweet spot." Listen to them in other areas of the room. Spend some time with them and you'll see what I mean.

Subject: Re: I understand a little bit better now!
Posted by spkrman57 on Thu, 31 Mar 2005 12:35:56 GMT
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Wayne, My horns on top of the 2226 in the JBL 3677 cabinet are portable(sitting on top), and the crossover is designed for quick change-out.I will do some more listening and swap between the Martinelli 650hz tractix and the Edgar 650hz round tractix. I was going to be doing a listening test between my JBL 2426 and my Altec 902 to see the "aluminum vs titanium" sound differences.Bill E. will be visiting me Saturday, so I am lucky to get a unbiased extra set of ears for the

testing.Ron

Subject: Re: I understand a little bit better now!
Posted by Wayne Parham on Thu, 31 Mar 2005 13:10:38 GMT
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Sounds like a real nice time.Last night, I visited with Todd White at Iconic for a long time. One of these days soon, I'm going to get some of their 515's and 416's and try out some of their compression drivers. I forget the model numbers they're using now, but they're making copies of the older Altecs of those model numbers. Kinda thinking about making a new line with them.Anyway, I know you and Bill will have a good time. I hope to see you both again real soon!

Subject: Re: Directivity vs Omni-directional
Posted by GarMan on Thu, 31 Mar 2005 13:39:24 GMT
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Not to dispute your points on directivity Wayne, but I find it strange that the exact opposite approach has been marketed as the most "natural" approach, with omni-directional speakers. Their argument is that when sound is produced naturally, it radiates out spherically in all directions. Therefore, speakers should be designed to do the same thing. I think this argument is valid in some respect but flawed in others. Not all instruments radiates sound omni-directionally. Brass and woodwinds are examples. Even natural speech is directional to some extent.One thing I don't understand is how can omni-directional speakers be marketed at producing better soundstage and larger sweetspot when a large part of what you hear from them is reflected sound?Gar.

Subject: Uniformity
Posted by Wayne Parham on Thu, 31 Mar 2005 14:07:39 GMT
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Actually, the key thing is uniformity. What I want is good response on-axis as well as off-axis. What I don't like as much is when the response changes dramatically depending on where you are. So if the speaker is truly omnidirectional, then it's uniform. The problem is when parts of the frequency band are omnidirectional and other parts are directional. Then what happens is reflections have an unbalanced tonal quality and the room is charged non-uniformly.

Subject: Re: I understand a little bit better now!
Posted by Bill Martinelli on Fri, 01 Apr 2005 02:28:35 GMT
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You and Epstein have fun this weekend. The horns you have are 800hz exponential horn with a conical throat. Make sure there is a good blend between the throat and the horn too. The old E-series horns were just a rough bore and the customer had to finish that blend. The new models are complete in that respect since it was problematic.Bill

Subject: Re: Directivity vs Omni-directional
Posted by Mike.e on Thu, 07 Apr 2005 00:58:53 GMT
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Just look at any number of HIFI companys,its much easier to put 4" + 1" woofers on a tiny box, than consider non WAF alternatives!Big 15"s, horns and such,higher manufacturing costs tooIts funny how almost every company does it,the little box.Linkwitz shows how a 4" can only be used so high ,2khz? before its radiation pattern is less than 90°cone,meaning 3ways are a must for a decent LE system.See the publications section. He even applies bucket brigade delay to fix up some of the fixed delay involved in the active filter chosen,i like this approach.I too dont like the idea of one woofer gradually getting more directive-then at Fc omnidirectional tweeter!A very sudden change vs Waynes and Geddes approach to have more uniform,more constant Directivity! Ive just got to try it when funds allow!harmon kandon have some whitepapers on the mainpage,they too are looking for uniform DI but most dont realise that the right horn can do this.btw just looked at some cheap PYLE bullet tweeter,the FR looks amazingly crazy!CheersMike.e